

REMARKS

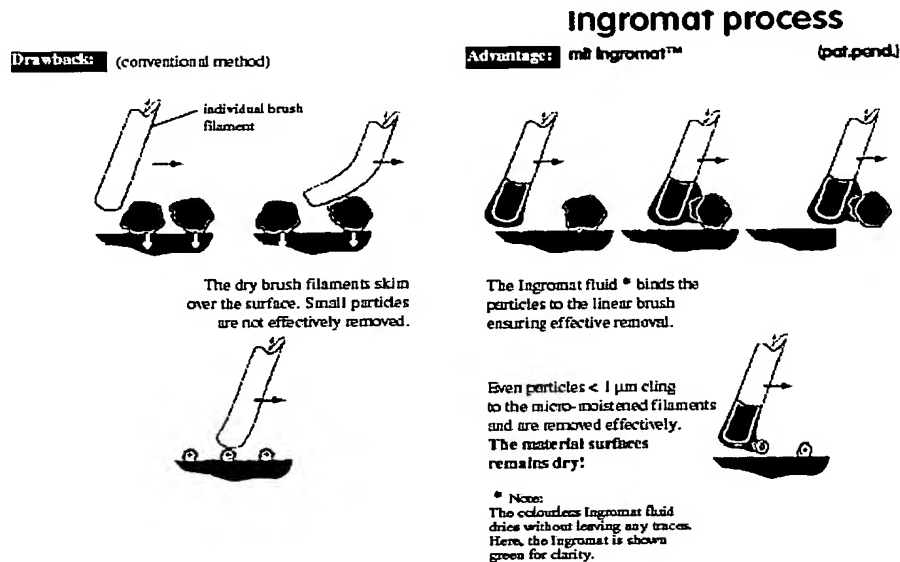
The objections raised to the drawings, in PTO form-948 accompanying the official action, are acknowledged by the Applicant. In accordance with the Examiner's explanation, the Applicant has amended claim 39 regarding the phrase "one of obliquely" and has now removed this language with the appropriate indications (strike through) and thus believes this drawing objection to be overcome.

Claims 39-42, 46-50, 43, 54, 58, 59, 71-74 and 78 are rejected, under 35 U.S.C. § 103, as being unpatentable in view of The Ingromat Cleaner CH 29 publication ("Ingromat") and in the alternative under 35 U.S.C. § 103 as obvious over Ingromat in view of Herrington '413. The Applicant acknowledges and respectfully traverses the raised obviousness rejection in view of the above amendments and the following remarks.

The Official Action continues to maintain that Ingromat is allegedly "an apparatus for *machining* a workpiece..." Para. 5, l.2. Also, that the Ingromat device guides a workpiece so as "...to be *machined* transversely.." Para. 5, l.8. The Applicant is entirely familiar with the Ingromat device(s) and has thoroughly reviewed the cited publication and reiterates that Ingromat cleans a surface, it does not "machine" i.e. do work, on a surface as specifically recited in the presently claimed invention and that this is an important fundamental difference between the present invention and the cited reference.

As previously discussed Ingromat uses one or more conveyor devices with brushes mounted to wipe or pass over a work surface and remove micro particles from that surface. The cleaned surface is merely wiped by Ingromat to prepare the workpiece for further finishing, such as; silicon wafers to be used as integrated circuits, or newly manufactured car parts that are then painted and surface treated. In fact, in most cases the Ingromat brushes do not even contact the surface being cleaned. The Ingromat brushes use an electro-static fluid to wet the brushes, the wet brushes are then passed over the surface of the workpiece and micro particles

are pulled from the surface and adhered to the brushes, leaving the workpiece dry and intact; the optimal objective for the cleaning process in these types of manufacturing applications.



Literal translations of the description provided in the German Ingromat publication cited by the Examiner actually support the Applicant's assertion that Ingromat discloses merely cleaning, not "machining" of the workpiece. At page 17 of the Ingromat publication relating to the CH 29 device specifically states "integrierte Linearbursten (8-fach) zur beidseitigen Reinigung der Oberfläche, Wischrichtung von Plattenrand zu Plattenrand" The translation of this phrase in english is: For cleaning from both sides of the web, wiping from side to side. "Wiping" and "cleaning" is not "machining" as understood by those in the art.

The word "machining" is a very well known term of art and includes a series of specific metal working process and is defined in Wikipedia by the following:

Machining is a collection of material working processes that involve using power driven machine tools, such as lathes, milling machines, and drill presses, to shape metal or plastic by removing excess material.

The On-line Merriam Webster Dictionary, <http://www.merriam-webster.com/dictionary/machining> defines the word machining as;

:to process by or as if by machine ; *especially* : to reduce or finish by or as if by turning, shaping, planing, or milling by machine-operated tools

Clearly the express disclosure of Ingromat is to clean and wipe the main surface of the workpiece, not to machine, mill, drill, plane, shape work, remove or reduce the metal material as in the presently claimed invention. In fact the gentle wiping and cleaning operation for removing dust and micro-particle debris disclosed by Ingromat is entirely different from the Applicant's claimed metal working and machining process which actually changes the chemical and structural form of the workpiece. The objective of leaving the surface intact and undisturbed in Ingromat is fundamentally and entirely different than both the present invention which *machines* the surface, and also Herrington '413 which also machines the surface of the work piece.

In the Applicant's disclosure each brush of the conveyor device is intended to uniformly machine, grind or work a surface removing an oxide layer and/ or other burrs or imperfections. This feature of machining and working the surface of a material is clearly different from the wet brush particle removal system of Ingromat for wiping and cleaning the surface without disturbing or modifying in any way the underlying material.

Be that as it may, what is of critical importance in regards to the present invention and amended claims is that the present invention is specifically directed to the machining of the cut edge surfaces and cut edges of a workpiece as opposed to, or in addition to the main opposing surfaces of the workpiece. As discussed in the Background of the Invention the machining of all cut edge surfaces and edges of the workpiece is very important;

[007] During the laser cutting of metallic workpieces, an oxide layer or oxide skin is formed *at the cut edges and at the cut surfaces*. A

drawback of the oxide layer is that a coating applied to it by painting or galvanization flakes off again relatively quickly. For this reason, the metallic workpieces are ground before being painted and galvanized.

[008] A drawback with grinding *the cut surfaces or cut edges*, i.e. removing the oxide layer from them - an operation also known as descaling - is that it sharpens the cut edges, resulting in an increased risk of injury. Therefore, the cut edges may have to be blunted again after the grinding operation. (emphasis added.)

In this regard, claim 39 has been clarified to include more specific features relative to the cut edges and edge surfaces of the work piece. As discussed above, a principle focus of the present invention is to machine the side edge surface(s) formed around, in or through the work piece itself. As can be appreciated, these edge surfaces are cut or formed at an angle relative to the main upper and lower surfaces i.e. they could be the outermost side edges of a steel plate or alternatively, the sides edges of a hole drilled in or through the steel plate between the upper and lower main surfaces. This is an important aspect to the present invention which is very different from the Ingromat reference and Herrington `413 which are concerned only with cleaning, and in the case of Herrington `413, machining only the main upper and lower surfaces. The Applicant addressed this drawback of the prior art such as Herrington `413 in the Background of the Invention;

[009] The document of the generic type referred to above shows a method and an apparatus for removing the oxide skin from metal blanks. The metal blank is guided between rotating, material-removing machining tools arranged in pairs in order for the oxide layer to be removed from the cut surfaces. Although this method can be used to clean the oxide layer off the outer cut surfaces, it is not possible to remove the oxide layer from inner cut surfaces, e.g. from cutouts or similar apertures in the workpiece. Furthermore, the metal blank has to be fed to a further machining apparatus if the surface or main face of the workpiece also needs to be cleaned.

Neither reference cited in the Official Action either alone or in combination addresses any aspect of cleaning or machining the side edge surfaces or cut edges of a workpiece whether it is the side edge formed by a hole, cavity or otherwise cut in the workpiece or even the peripheral side edges of the work piece itself. The Applicant disclosed the novel aspect of the present invention specifically at paragraphs 20 and 21 of the specification.

[020] The inventor has discovered that, surprisingly, the linear profile of the brush in the region of the workpiece to be machined ensures that *the brush penetrates into all cutouts or holes in the workpiece and therefore removes the oxide layer at all cut surfaces and cut edges.* Consequently, the brush moves along the workpiece obliquely or transversely with respect to the direction of advance of the workpiece and penetrates into each cutout, similarly to a paintbrush which is pulled along a piece of metal. (emphasis added.)

[021] It is advantageous for the apparatus according to the invention to machine the surfaces, i.e. the main surfaces of the metallic workpieces in strip or plate form and also to descale the cut surfaces and cut edges. Simultaneous descaling of the cut surfaces and cut edges and cleaning of the main surfaces was not possible with the apparatuses which have been disclosed hitherto.

The claims are clarified to reflect these important aspects of the present invention where all the sides, edge and cut surfaces (as opposed to or in addition to the main surfaces) are machined. The claim 39 has been amended to specifically recite “ ..the apparatus performs at least one of removing an oxide layer, grinding, deburring and descaling at least *the edge surface of the workpiece,*”. In this regard, claim 39 goes on to recite the novel feature, “wherein the at least one brush of each of the first and second conveyor devices machine substantially *all the edge surface of the workpiece* in opposite directions, and the at least one brush of each of the third and fourth conveyor devices machine substantially all the edge surface of the workpiece in opposite directions.” (emphasis added.)

Similarly, claim 46 is amended to recite, "wherein the at least one brush of each of the first and second conveyor devices machine the edge surface of the workpiece in opposite directions to ensure that substantially *all the edge surface of the workpiece* is machined." (emphasis added.) Support for these amendments is expressly found at least at paragraph 020, lines 1-5 of the Applicant's specification.

Neither Ingromat nor Herrington `413 either in combination or alone provide any disclosure of machining of the cut sides or side surfaces of the work piece. Even if it is arguable that Ingromat "machines" a workpiece, and the Applicant does not hereby concede this argument, Ingromat clearly does not disclose, teach or even suggest in any manner effecting, cleaning or wiping any side edges or edge surfaces of the workpiece. Ingromat only cleans or wipes the main top and bottom surfaces and cannot by its very nature clean the side edges or edge surfaces of holes which are formed in the work piece.

Turning more directly to Harrington `413 the Applicant appreciates that Harrington `413 arguably discloses an apparatus for removing scale from a metallic surface. While the Applicant still asserts that the combination of this reference with the Ingromat cleaner is unsupportable both practically and theoretically, and incorporates the Applicant's previous arguments by reference herein, any such combination still fails to disclose, teach or suggest in any manner the important aspect of the present invention relating to machining of the edge surfaces and cut edges of the workpiece.

Herrington 413 discloses the apparatus for removing scale however it only does this on the main surface of the advancing strip 12. The disclosure of Herrington `413 teaches that there should be only minimal contact of the brushes with the edge surfaces of the advancing strip 12 to reduce wear and damage to the brushes, at column 3 line 29-34, "[t]he width of the zones can also be varied by vertical adjustment of the brushes 18, 18. However the brushes should not be advanced toward the strip to a position where the fibers are subjected to undue

wear and where the strip may be subjected to abrasions unwarranted by the cleaning results. When the brushes having a diameter of 8 inches are used it has been found that penetration of approximately 0.04 inches is preferable. By "penetration" is meant the distance the brush is moved toward the strip from a position tangent there to."

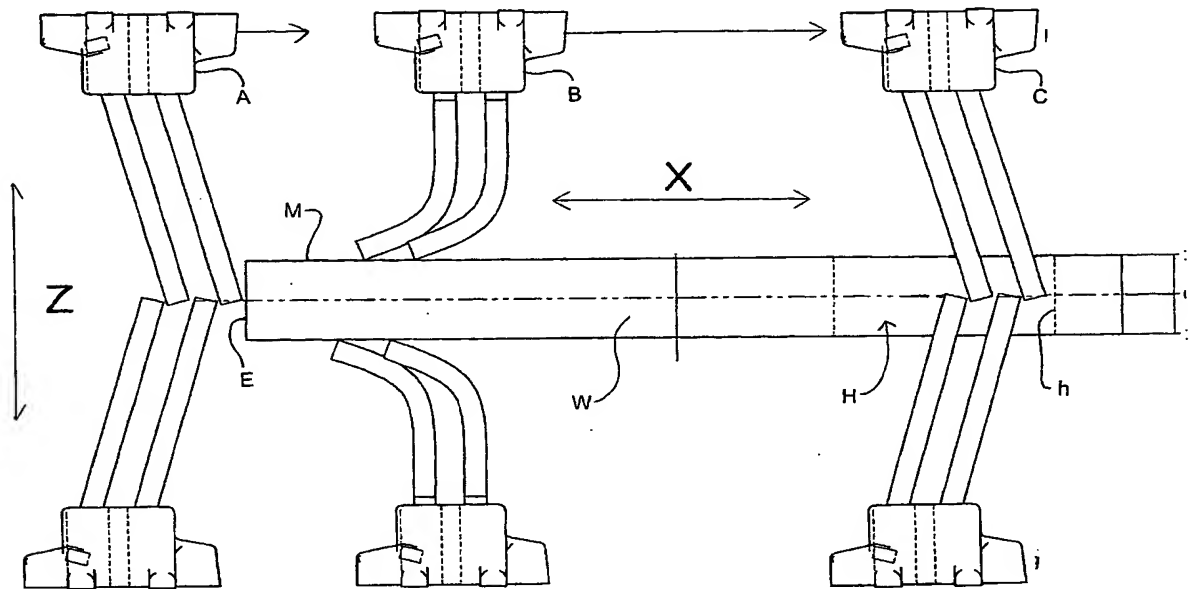
Although Herrington `413 does disclose this minimal penetration, Herrington `413 in fact teaches limiting this penetration to ensure that the surface is not overly abraded or scratched by these brushes or bristles. This teaches away from complete machining of the entire side edges and edge surfaces of a workpiece or the entirety of the side surfaces of a hole as in the present invention. For at least these reasons, neither reference, either alone or in combination teaches the newly recited features of claims 39, and similarly 46, "wherein the at least one brush of each of the first and second conveyor devices *machine the edge surface* of the workpiece in opposite directions, and the at least one brush of each of the third and fourth conveyor devices *machine the edge surface of the workpiece* in opposite directions to ensure that substantially all the edge surface of the workpiece is machined."

Turning to added new claims 79-89, these claims reflect another important aspect of the present invention relating to the inclined bristles of the brushes shown in figures 13-16 of the original disclosure. For purposes of the following remarks the Applicant introduces a explanatory figure to show the importance of the structure and function of the angled brushes.¹ It is also of importance to the present invention that the bristles of the brushes are inclined by up to 45 degrees, preferable by 15 degrees, in the forward direction of rotation relative to the workpiece. Observing the exemplary figure below, due to the fact that the bristles of the brush

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This figure is not in any event believed to incorporate any new subject matter not specifically described and disclosed in the Applicant's original specification as they comport specifically with the disclosure at para. 094. For this reason if the Examiner feels it is appropriate to amend the figures of this Application to include this explanatory figure the Applicant would potentially be amendable to such an amendment.

A are inclined forward in the direction of movement relative to the workpiece W when the head of the inclined bristles hits the edge surface E of the workpiece W the entire edges surface E is machined.



Observing the brush B, as the bristles are forced along a main surface M of the metallic work piece W the head of the bristles align backwards (regarding the direction of movement). But critically if there is a hole H, having edge surface h, the head of the bristle "jumps" forward as shown by brush C.

Besides the amendments made to independent claim 78 incorporating the above discussed subject matter, new dependent claim 79 includes the features relating to this further aspect of the present invention, " wherein a plurality of bristles (12) of the at least one brush (3) of each of the first and the second conveyor devices (2, 2, 2, 2) are each parallel inclined by up to 45° and a tip of each of the plurality bristle is located in front of an opposite end of each respective bristle in the forward direction of rotation of the first and second conveyor devices."

These feature are clearly shown in Applicant's figures 13-16. While Herrington `413 may arguably show a mass of slightly inclined bristles, these bristles are certainly not *parallel*, and neither is the tip of *each* bristle located in front of the base of the bristle in the direction of rotation.

This important feature of the present invention is discussed at para. 094 of the Applicant's specification;

[094] Fig. 13 shows a segment 15b or a piece 15a of a carrier 15 with inserted bristles 12. The bristles 12 of the brush 3 are inclined by a maximum of up to 45°, preferably by 15°, in the direction of rotation. This means that the tips of the bristles 12 are located in front of the opposite end of the bristles, which is connected to the carrier 15, as seen in the direction of rotation. *As tests have shown, the bristles 12 which are inclined by 15° penetrate into cutouts in the workpiece 1 in a particularly advantageous way, resulting in particularly advantageous removal of the oxide layer from cut surfaces 1b and cut edges 1a of the workpiece 1.* Of course, it is also possible for the bristles to be inclined beyond 45°, but this may lead to jamming and damage to the bristles 12 as they penetrate into the cutouts in the workpiece 1. (emphasis added.)

Also, new independent claim 81 is added to incorporate the above discussed subject matter along with the novel aspects of the carrier portion of the brush which supports these inclined bristles. Related new dependent claims 82 and 83 emphasize the structure relating to the individual brush segments (15b) having a groove (18) and a tongue (19) at the other end as it is shown in figure 12 (and also as recited in claims 67) none of such structure being disclosed, taught or suggested either expressly or inherently in the cited references. Paragraph 092 of the Applicant's specification discusses the importance of this structure;

[092] Fig. 12 shows an advantageous embodiment of the segments 15b. The segments 15b each have a groove 18 at one end and a tongue 19 at the other end, by means of which the segments 15b can be

connected to one another. Twisting of the segments 15b is prevented in a simple and advantageous way by this tongue-and-groove connection.

In view of the above amendments and remarks, it is respectfully submitted that all of the raised obviousness rejections should be withdrawn at this time. If the Examiner disagrees with the Applicant's view concerning the withdrawal of the outstanding rejection(s) or applicability of the Ingromat and Herrington '413 references, the Applicant respectfully requests the Examiner to indicate the specific passage or passages, or the drawing or drawings, which contain the necessary teaching, suggestion and/or disclosure required by case law. As such teaching, suggestion and/or disclosure is not present in the applied references, the raised rejection should be withdrawn at this time. Alternatively, if the Examiner is relying on his/her expertise in this field, the Applicant respectfully requests the Examiner to enter an affidavit substantiating the Examiner's position so that suitable contradictory evidence can be entered in this case by the Applicant.

If any further amendment to this application is believed necessary to advance prosecution and place this case in allowable form, the Examiner is courteously solicited to contact the undersigned representative of the Applicant to discuss the same. In view of the foregoing, it is respectfully submitted that the raised rejections should be withdrawn and this application is now placed in a condition for allowance. Action to that end, in the form of an early Notice of Allowance, is courteously solicited by the Applicant at this time.

The Applicant respectfully requests that any outstanding objection(s) or requirement(s), as to the form of this application, be held in abeyance until allowable subject matter is indicated for this case.

10/533,108

In the event that there are any fee deficiencies or additional fees are payable, please charge the same or credit any overpayment to our Deposit Account (Account No. 04-0213).

Respectfully submitted,



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